The following are micrometer readings for ten bisections of the division under microscope E (pointer reading 164° 45′) before and after wiping off the vaseline :—

Before.		After.	
	r	r	r
608	·611	·633	·618
·613	·612	·627	·620
·603	·604	·629	·624
·589	·593	·620	·632
·600	·590	·622	·624
Mean	r·602	Mean	r·625

Difference : r·023 = 1″·40

As a consequence of these revelations, the cleaning of the circle, which hitherto has naturally been avoided as much as possible for fear of injuring the graduations, will be carried out more frequently.

Observations of Minor Planets from Photographs taken with the 30-inch Reflector of the Thompson Equatorial at the Royal Observatory, Greenwich, during the year 1903.

(*Communicated by the Astronomer Royal.*)

The following positions of minor planets were obtained from photographs taken with the 30-inch Reflector during the year 1903.

The plates were measured with the astrographic micrometer. Four reference stars were, as a rule, measured with the planet, their positions being derived when possible from the Catalogues of the Astronomische Gesellschaft.

The positions given are not corrected for Parallax.

log Parallax Correction = log Parallax Factor − log Δ.

The anonymous planet was found on the same plate as (407) Arachne.

Date and G.M.T. 1903.		Apparent R.A.	Apparent Dec.	Log. Parallax Factor. R.A.	Dec.
d	h m s	h m s	° ′ ″		
		(258) Tyche.			
May 25	10 41 29	14 38 6·48	−7 40 58·1	+8·321	+0·876
26	9 55 41	14 37 25·65	−7 34 56·3	+8·669	+0·876
		(68) Leto.			
May 29	11 25 13	15 13 48·14	−20 43 7·1	+8·723	+0·921
June 2	10 46 9	15 10 18·77	−20 38 24·5	+8·462	+0·921
3	10 29 3	15 9 28·86	−20 37 15·3	+7·931	+0·922
4	10 4 18	15 8 40·18	−20 36 7·5	−8·408	+0·921

Date and G.M.T. 1903.	Apparent R.A.	Apparent Dec.	Log. Parallax Factor. R.A.	Dec.
d h m s	h m s	° ′ ″		
(17) Thetis.				
May 29 11 58 12	16 59 51·84	−14 11 6·9	−8·772	+0·902
June 2 11 18 49	16 56 12·69	−14 11 50·4	−8·961	+0·900
3 11 11 36	16 55 16·89	−14 12 15·7	−8·983	+0·900
4 11 47 10	16 54 18·99	−14 12 45·5	−8·472	+0·902
22 11 5 57	16 38 20·83	−14 38 54·8	+8·664	+0·904
(511) Davida.				
June 2 11 48 24	16 49 57·68	−9 13 4·5	−8·511	+0·883
3 12 9 25	16 49 10·12	−9 13 46·2	+7·909	+0·883
4 11 27 1	16 48 24·63	−9 14 30·2	−8·726	+0·883
(304) Olga.				
June 3 11 42 3	15 29 10·14	+8 17 20·4	+8·960	+0·779
4 10 28 42	15 28 23·81	+8 17 39·8	−8·249	+0·778
(434) Hungaria.				
June 2 12 23 56	16 16 25·39	+22 29 49·8	+8·925	+0·631
4 10 57 43	16 14 36·50	+22 36 36·4	−8·684	+0·626
22 10 35 59	16 0 57·07	+21 55 8·2	+8·779	+0·636
24 10 22 53	15 59 57·33	+21 40 3·6	+8·711	+0·640
(432) Pythia.				
June 22 11 27 42	16 52 3·91	−19 46 40·1	+8·760	+0·919
27 10 36 45	16 47 36·66	−20 26 1·9	+8·077	+0·921
July 1 10 36 53	16 44 29·33	−20 57 31·9	+8·647	+0·922
(405) Thia.				
June 22 11 54 50	17 23 0·93	−19 29 50·0	+8·733	+0·918
27 11 43 24	17 18 40·46	−18 53 17·8	+8·878	+0·915
July 1 11 5 2	17 15 36·32	−18 26 19·0	+8·624	+0·915
(270) Anahita.				
Aug. 4 11 57 52	20 22 25·63	−15 13 57·6	+8·616	+0·906
5 10 38 24	20 21 32·44	−15 16 5·6	−8·915	+0·904
10 10 29 57	20 17 3·00	−15 27 24·4	−8·749	+0·906
13 9 58 44	20 14 35·56	−15 34 7·1	−8·924	+0·905

Date and G.M.T. 1903.	Apparent R.A.	Apparent Dec.	Log. Parallax Factor. R.A.	Dec.
(57) Mnemosyne.				
d h m s	h m s	° ′ ″		
Aug. 4 11 39 53	19 39 27·24	+0 10 56·1	+8·899	+0·835
5 9 44 42	19 38 50·55	+0 6 49·2	−8·984	+0·835
6 10 9 25	19 38 10·50	+0 2 8·5	−8·694	+0·836
7 10 6 44	19 37 31·86	−0 2 33·6	−8·665	+0·836
10 10 9 34	19 35 40·30	−0 17 17·0	−8·317	+0·838
13 9 28 56	19 33 56·84	−0 32 43·2	−8·803	+0·839
(147) Protogenia.				
Aug. 5 11 8 19	21 24 0·62	−12 32 43·0	−9·123	+0·892
13 11 7 46	21 17 52·19	−12 59 26·6	−8·865	+0·897
22 11 14 1	21 11 5·03	−13 29 53·9	+7·693	+0·900
(407) Arachne.				
Aug. 5 11 25 49	21 44 50·01	−7 53 4·4	−9·127	+0·875
6 10 59 25	21 43 58·25	−7 53 50·5	−9·221	+0·873
31 11 25 11	21 21 21·29	−8 33 47·6	+8·808	+0·880
Sept. 1 9 59 38	21 20 36·37	−8 35 37·0	−8·819	+0·880
(Anonymous.)				
Aug. 6 10 59 25	21 40 47·82	−7 20 8·6	−9·209	+0·871
31 11 25 11	21 20 30·19	−8 17 4·9	+8·819	+0·879
Sept. 1 9 59 38	21 19 52·08	−8 19 35·8	−8·819	+0·879
(324) Bamberga.				
Aug. 31 11 51 34	22 3 40·60	−9 43 8·3	+8·589	+0·885
Sept. 1 10 17 35	22 2 42·34	−9 37 21·3	−9·023	+0·883
7 9 40 11	21 56 45·23	−8 59 41·2	−9·071	+0·880
9 10 12 59	21 54 53·28	−8 46 38·3	−8·699	+0·881
11 10 32 9	21 53 7·53	−8 33 31·1	−7·509	+0·881
(333) Badenia.				
Sept. 11 10 58 46	22 32 49·07	−10 51 22·3	−8·387	+0·890
(184) Dejopeja.				
Aug. 31 12 54 27	22 41 3·51	−8 13 1·4	+8·895	+0·878
(514) 1903. M. B.				
Aug. 31 13 20 47	22 54 43·86	−0 54 48·9	+8·991	+0·841
(513) 1903. L. Y.				
Aug. 31 12 20 27	23 11 34·82	+0 28 50·7	−8·379	+0·833

Enhanced Lines of Iron in the Region F to C. By A. Fowler.

In view of the now generally recognised importance of enhanced lines in the interpretation of solar and stellar spectra, it is thought that the accompanying observations of the enhanced lines of iron which occur in the less refrangible parts of the spectrum may be useful to other workers.

The lines have been observed and photographed under various conditions: in the spark, in the arc at reduced pressure, in the arc in hydrogen, and on the positive pole of an ordinary continuous-current arc in air at atmospheric pressure, metallic electrodes being used throughout. There is a distinct gain in producing the lines without the use of a spark in a few cases, inasmuch as there is no air spectrum to interfere with their detection.

The occurrence of the enhanced lines on the positive pole of the arc affords a particularly convenient mode of identifying them, except towards the red, where the continuous spectrum tends to mask the fainter lines. When the bright spot on the positive pole is carefully adjusted on the slit, the lines in question are observed as very short lines, quite different in appearance from the arc lines, which are also present and provide a convenient reference spectrum; unlike the enhanced lines, the arc lines are either weakened or unchanged on the positive pole. A similar appearance is observed on the negative pole, but the enhanced lines are not so bright. In these experiments the current has ranged from 12 to 0·4 ampères, on 110-volt circuit, with an approximately constant potential difference of 40 volts between the electrodes, and the intensities of the enhanced lines have not been found to be materially changed as compared with the arc lines observed at the same time. Even with 0·4 ampères, the arc burning continuously, all the arc lines remained visible when the proper part of the image was brought on the slit, and the enhanced lines were still very distinct in the immediate neighbourhood of the poles.

This result is somewhat different from that obtained by Hartmann with magnesium poles, in which case the enhanced line 4481 is greatly strengthened as the current is reduced. It differs also from Prof. Hale's recent observations of the iron spectrum,* in which a 2-ampère arc was found to give a spectrum closely approximating to that of the outer flame of an ordinary arc with greater current, though no material change was observed in passing from 30 to 15 ampères. It may be that the difference is partly due to the use of metallic electrodes in my experiments, while Prof. Hale appears to have used the metal on carbon poles; under the latter conditions I have obtained similar results with the 2-ampère arc, but only when the quantity of iron on the poles was small. At all events, when metallic poles are used, reduction of current strength does not appear to be accompanied by a reduction of temperature sufficient to produce any notable differences in the

* *Astrophys. Journal*, vol. xxiv. p. 208.